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Revision B
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George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

ORGANIZATIONAL INSTRUCTION

MSFC Safety and Mission Assurance Independent Assessment Implementation Plan

OPR
QD10, QD20, QD30

OPR DESIGNEE
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CHECK THE MASTER LIST-
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		9/3/02	Incorporates statement of requirements action from HQs
Revision	A	7/15/04	Updated OI to implement HQ Rules Review in accordance with CAITS Action # 04-DA-01-0387) (Utilizing the word "Shall" for all requirements, removing ambiguity, removing non-requirements, etc.) General revision to reflect current procedures following transition of responsibility from Code Q to MSFC S&MA
Revision	B	12/16/04	Administrative change – put in correct format

MSFC Safety and Mission Assurance Independent Assessment Process

1. INTRODUCTION

1.1 Purpose

The purpose of this Organizational Issuance is to define work instructions and processes involved in performing independent assessments of programs and projects at the Marshall Space Flight Center (MSFC). Independent Assessments are performed in support of the National Aeronautics and Space Administration (NASA) Headquarters Office of Safety and Mission Assurance (OSMA), as described in the following documents. NPR 1000.3, "The NASA Organization", paragraph 4.17.2.1, states that the OSMA provides executive leadership, policy direction, functional management, assessments, and coordination for independent assessments of flight and ground systems to ensure suitable attention has been given to risk assessment and risk management and that all Safety and Mission Assurance (S&MA) requirements are being met. According to NPD 8700.1B, "NASA Policy for Safety and Mission Success", paragraph 5f(4), independent assessments are performed to enhance the success of programs, projects and activities; and the effectiveness of S&MA activities.

1.2 Objective

MSFC Independent Assessment (IA) objectives are to perform independent assessments of selected critical systems, functions, and processes of MSFC managed programs and projects and advise management of the potential technical risks, particularly risks which may impact concurrence on the Certification of Flight Readiness (CoFR). Specific objectives of Independent Assessment activities are to optimize the effectiveness of S&MA processes by:

A) Assessing technical, project/programmatic risks, and health;
B) Identifying and assessing technical issues, making recommendations for resolution, and providing NASA management with non-advocacy assessments of program/project health and status;
C) Providing technical assessments of selected products and processes including recommendations for process or product improvements;
D) Coordinating with OSMA and other Center IA offices on MSFC IA activities on a regular basis;
E) Collaborating with other IA offices on independent assessments as necessary.

1.3 Scope

All MSFC managed programs/projects and activities are subject to independent assessments. Programs/projects in scope include, but are not limited to, the Space Shuttle Program, the International Space Station Program, and Advanced Projects. Both civil service, including their support contractors, and prime contractor activities are subject to independent assessments. Payloads to be flown in the Space Shuttle or on Expendable Launch Vehicles as well as other MSFC-managed payload operations are also subject being assessed.

When requested by the NASA Headquarters Office of Safety and Mission Assurance, other NASA programs/projects and activities shall be in scope.

1.4 Applicability

This Organizational Instruction (OI) is applicable to all Independent Assessment activities conducted by the MSFC S&MA/ Safety, Reliability and Quality Assurance Policy, and Assessment Department in support of the Headquarters OSMA Level I Technical Program Plan for Human Space Flight, UPN 323-94.

2. APPLICABLE DOCUMENTS AND REFERENCE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

NPD 8700.1B	NASA Policy for Safety and Mission Success
NPR 1000.3	The NASA Organization

2.2 REFERENCE DOCUMENTS

NPR 8715.3	NASA Safety Manual
NPR 7120.5	NASA Program and Project Management Processes and Requirements
MPD 1280.1	Marshall Management Manual
MPG 1440.2	Marshall Records Management Program

3. DEFINITIONS

Assessment – A review process using predetermined methods that evaluate hardware, software, procedures, processes, technical and programmatic documents, and the adequacy of their definition and implementation. An assessment is different from an audit in that assessments do not follow a predetermined schedule and are concerned about results of requirements implementation as well as requirements compliance.

Engineering Information Reports – An informal report that documents an event or review when no assessment is required. It is for information only, and shall be directed to the IA Manager for determination of further distribution.

Fact – Information, objective evidence or data noted during the performance of an Assessment/ Audit/Evaluation relevant to findings, observations, and recommendations. Facts support the logic trail leading to findings, observations, and recommendations.

Finding - A noncompliance with specified requirements discovered during an Assessment/Audit/Evaluation.

Observation - A strength or weakness identified during an Assessment/Audit/ Evaluation. Strengths indicate no action is required because the function is healthy as is. A weakness represents a deficiency that warrants improvement and may have the potential to adversely affect safety or mission assurance if not resolved.

Recommendation - Actions proposed by the Assessment/Audit/Evaluation Team as a result of a Finding or Observation noted during an Assessment/Audit/Evaluation.

Systemic Problems – Problems that have a root cause that is not controlled or whose controls are not adequate. Systemic problems are problems that cannot be explained as an isolated incident. They are problems that can precipitate other problems.

Record Custodian – The individual who is responsible for collecting, accessing, filing, storing, and maintaining records generated for IA. For this document, the MSFC IA supervisor is the records custodian.

4. INSTRUCTIONS

IA activities concentrate on value-added assessments of Program/Projects primarily during the development phase; however, assessments can be and are performed throughout the program's life cycle (e.g., concept, design, development, test and evaluation (DDT&E), manufacturing and assembly, launch, operations and post-flight). These assessments provide management personnel with "independent" reviews of Program/Project activities, which can improve/enhance the Program/Project. Leading indicators (plans, reports, audits, milestone reviews, process Failure Modes and Effects Analyses (FMEAs), process risk activities, trends, etc.) and trailing indicators (e.g., nonconforming condition reports, post flight data, escapes, failures, lost time accidents, audit results, mishaps, etc.) are used to identify potential independent assessments. Independent Assessments are also triggered by a customer's request or information gathered during program/project reviews.

The following paragraphs contain procedures and instructions that are used in the performance of QD40 Independent Assessment activities. The process flow is represented in Figure 1, "Independent Assessment Process". The process outlined herein is for routine assessments, where time permits assessment completion without adversely impacting a time critical decision. For quick turnaround assessments, the results of which can impact a time critical decision, the IA supervisor and/or the IA Manager shall direct modification to any part(s) of the following process in order to minimize time needed to perform the assessment.

The MSFC IA organization is shown in Figure 2.

4.1 IA Manager's Responsibility

The MSFC IA Manager reporting directly to the MSFC S&MA Director is responsible for strategic and tactical direction of the IA program at MSFC. The IA Manager establishes and maintains coordination with the NASA Headquarters (HQ) OSMA IA focal point of contact, Program/Project Management at MSFC, Program/Project S&MA Managers, other customers requesting assessments, as well as the Kennedy Space Center (KSC) and Johnson Space Center (JSC) IA organizations. Other duties include developing the MSFC IA Level II Technical Program Plan and the MSFC IA Implementation Plan, providing monthly reports to HQ OSMA, submitting pertinent information to the IA website administered by Johnson Space Center (JSC) in support of all IA functions, and approving and presenting the IA position at Pre Flight Assessment Reviews (PARs).

4.2 IA Supervisor's Responsibility

The IA Supervisor responsibilities are as follows:

4.2.1. Manage

Plan, organize and lead the IA function, including coordination with S&MA management; support periodic teleconferences and face-to-face meetings with NASA HQ (OSMA, and others when required); assign IA analyst(s) to each program/project selected and perform the following assessment-specific activities.

4.2.2. Obtain Manpower

Interview and hire staff as authorized. Obtain temporary expertise and skills that are not available in the current staff from other sources as required to support assessment activities.

4.2.3. Evaluate Proposed Assessments

Evaluate proposed assessments to assure that assessment efforts are prioritized commensurate with the seriousness of problems identified and present to IA Manager for approval.

4.2.4. Coordinate requested assessments

Coordinate customer requested assessments. Assure adequate resources and present to IA manager for approval.

4.2.5. Maintain a master list

Maintain a secure electronic master list of all assessments, including assigning an identification number for each assessment. Review this list on a periodic basis in teleconferences with OSMA and the JSC and the KSC IA groups.

4.2.6. Prepare Activity Reports

Prepare and transmit to the IA manager activity reports as required. This shall include, but is not limited to, reviewing and editing bi-weekly notes and generating monthly and quarterly reports.

4.3 Assessment Topic Identification

Topics are identified for assessment by various triggers such as program/project milestone reviews, program/project documentation, leading and trailing indicators, and customer requests. These are then presented to the IA manager for concurrence.

4.3.1. Assessment Description

IA Analysts perform regular assessments of primary program/project documentation and Project Milestone Reviews. With concurrence of the IA supervisor and manager, IA Analysts shall perform an assessment/evaluation at each project milestone review in an area of assigned responsibility, evaluate adequacy of the review, documentation, approach, and project's progress. See Appendix 4, Independent Assessment Review Responsibilities.

4.3.2. Participate in Meetings of Assigned Programs/Projects

IA Analysts participate in regularly scheduled and special meetings of assigned projects to gain insight into project management and technical performance of the project.

4.3.3. Investigate Problems

IA shall investigate to determine the extent of problems found during project interactions. This involves an examination of root cause and controls, if any, for that cause. Examinations determine if controls are adequate to deter similar problems from happening. A determination of similar project problems stemming from the root cause is also made. Systemic problems, when identified, shall be cause for initiating a proposed assessment.

4.3.4 Participate in Pre-launch Assessment Reviews (PARs)

Analysts shall support PARs for the Space Shuttle and ISS programs, and be attentive for areas of potential assessments. Contentious subjects on the PAR agenda or flight constraints shall be discussed with S&MA management during the PAR.

4.4 Assessment Planning

4.4.1. Develop Assessment Plan

Once a proposed assessment topic is identified, Analysts shall generate a plan using the Independent Assessment Plan/Report Form (see Appendix 1, Independent Assessment Plan/Report). Completed plans shall be submitted to the IA supervisor and manager for review and approval.

4.4.2. Approve Proposed Assessment Plans

The IA supervisor reviews assessment plans and concurs when the plan is in final form. The IA supervisor or designee shall assign an assessment identification number and input the plan to the secure database per Section 5.1, Records. Assessment plans are forwarded to the IA Manager for approval. Approved plans are returned to the IA supervisor. The IA supervisor shall determine if the database requires updating, update if necessary and return the approved plan to the applicable analyst for implementation. Any changes to an approved plan shall be coordinated with the IA supervisor and IA manager.

4.5 Assessment Execution

4.5.1. Provide In-Briefing

IA analysts shall brief impacted organization personnel in order to inform them of planned IA activity in their area of responsibility. Analysts shall solicit inputs from responsible personnel to improve assessments.

4.5.2. Execute Assessments In Accordance with Plans

IA analysts shall perform assessments within planned boundaries. The assessment shall extend to the degree necessary to determine the “health” of the scoped area(s). If problems are identified during the assessment that are outside the defined scope, the IA supervisor shall determine the best course of action and make recommendations to the IA Manager.

4.5.3. Coordinate Assessments with Projects

IA analysts shall coordinate with impacted organization personnel regularly throughout assessment activities and report perceived observations, facts and findings as they arise.

4.5.4. Prepare Assessment Reports

IA analysts shall prepare a report narrative. (See Section 5 of Appendix 1.) Reports shall have sufficient detail to convey details of the execution of the assessment. Observations, fact and findings are documented in this section with recommendations as appropriate. Assessment reports shall contain conclusions that discuss overall “health” and adequacy of the area assessed.

4.6 Report Approval

The IA supervisor shall review draft assessment reports with analysts and concur with reports in their final form and input the report to the secure database per Section 5.1, Records. The reports shall be electronically forwarded by the IA supervisor to the IA Manager or Designee for approval. The IA Manager or Designee shall review reports and provide comments to the IA supervisor. If a draft report requires revision, analysts shall revise and resubmit for approval/concurrence. The IA Supervisor shall determine if database changes are required and update if required. If any substantial changes are made to an approved report it must be returned to the IA Supervisor and Manager for review and approval/concurrence. If in doubt about a change, analysts shall consult with the IA Supervisor or IA Manager.

4.7 Provide Assessment Out-Briefing

Analysts are responsible for briefing appropriate impacted organization's management and/or other personnel on assessment status, findings, observations, facts, associated recommendations, adequacy and "health" of the assessed area (i.e., conclusions). Any findings discovered during the assessment shall be presented formally to the responsible manager for comments, corrective action, and any estimated completion dates. Observations, although less formal, shall be discussed along with any associated recommendations.

4.8 Obtain Assessment Responses

All assessment findings require responses. Normally these responses should be in writing on finding forms (See Appendix 2). However, if findings are clear and simple, the assessed organizational manager shall verbally indicate to analysts, at the out-briefing, responses for corrective action along with any associated estimated completion dates. Upon receipt of written or verbal responses, the draft report shall be up-dated to document each finding and/or observation response. Analysts shall forward final reports to the IA supervisor for review and input to the secure database per Section 5.1, Records.

4.9 Follow-up Assessment

All finding responses require follow-up. This could include reviewing documents, hardware, or other activities to ensure written responses are implemented. Observations follow-up is at the discretion of the IA management.

4.10 Engineering Information Report

Engineering Information Reports (See Appendix 3) provide assessors with an informal method of conveying information from Program/Project events, and results of reviews or meetings when no assessment is required. Its intended use is to inform MSFC IA management and, when required, other IA personnel of information obtained from the activities.

EIRs are generally 1-2 pages in length and require the concurrence of the IA Supervisor and IA Manager/designee's approval. Customers or the IA Manager may request an assessment be initiated based on information contained in an EIR. The IA supervisor shall provide an identification number and input the report to the secure database per Section 5.1, Records.

4.11 Trending

All Observations that identify weaknesses and all Findings shall be evaluated for root cause and trend. Each cause and impact shall be categorized into one of the following classes:

- Requirements Input
- Management
- Procurement
- Design and Engineering
- Design Verification and Test
- Software Design
- Software Verification and Test
- Manufacturing
- Manufacturing Verification and Test
- Inspection / Quality Assurance
- Operations
- Preflight Verification and Test
- In-flight Activities
- Post-flight Activities
- Other (identify)

The IA Supervisor and IA Manager shall review the data periodically and determine if additional assessments are required.

5. NOTES

5.1 OI Replacement – This instruction replaces QD-PA-006, Baseline Release, MSFC Safety and Mission Assurance Independent Assessment Implementation Plan.

6. SAFETY PRECAUTIONS AND WARNING NOTES

None.

7. APPENDICES AND REPORTS

7.1 Appendices

Appendix 1 Independent Assessment Plan/Report Form
Appendix 2 Independent Assessment Finding Form
Appendix 3 Engineering Information Report (EIR) Form
Appendix 4 Independent Assessment Review Responsibilities

7.2 Reports

Three activity reports are produced summarizing activities of the IA group:

1) Bi-weekly Notes- the IA Supervisor provides the IA Manager a summary of significant activities during the period;
2) Monthly Report- the IA Manager provides the NASA HQ point of contact a summary of significant activities for the period including IA successes and a financial report tracking expenditures against the level II Technical Program Plan;
3) Quarterly Report- the IA Supervisor provides MSFC S&MA management with a summary of significant activities for the period in accordance with a contractual Data Requirement.

In addition, the IA group supports an annual report for NASA contract management

8. RECORDS

Record	Repository	Period of Time
Independent Assessment Plan/Report Independent Assessment Findings Independent Assessment Engineering Reports	IA Supervisor	Records shall be maintained for five years, in digital form, in a secure database.

9. TOOLS, EQUIPMENT, AND MATERIALS

None

10. PERSONNEL TRAINING AND CERTIFICATION

Training of personnel is comprised of on-the-job training. New members participate with team members for a period of 6 weeks in performing independent assessments and reviewing the applicable documents defined in this instruction. There is no certification required for this task.

11. FLOW DIAGRAM

Figure 1, Independent Assessment Process, depicts the MSFC S&MA Independent Assessment Process Flow.

Figure 1 Independent Assessment Process

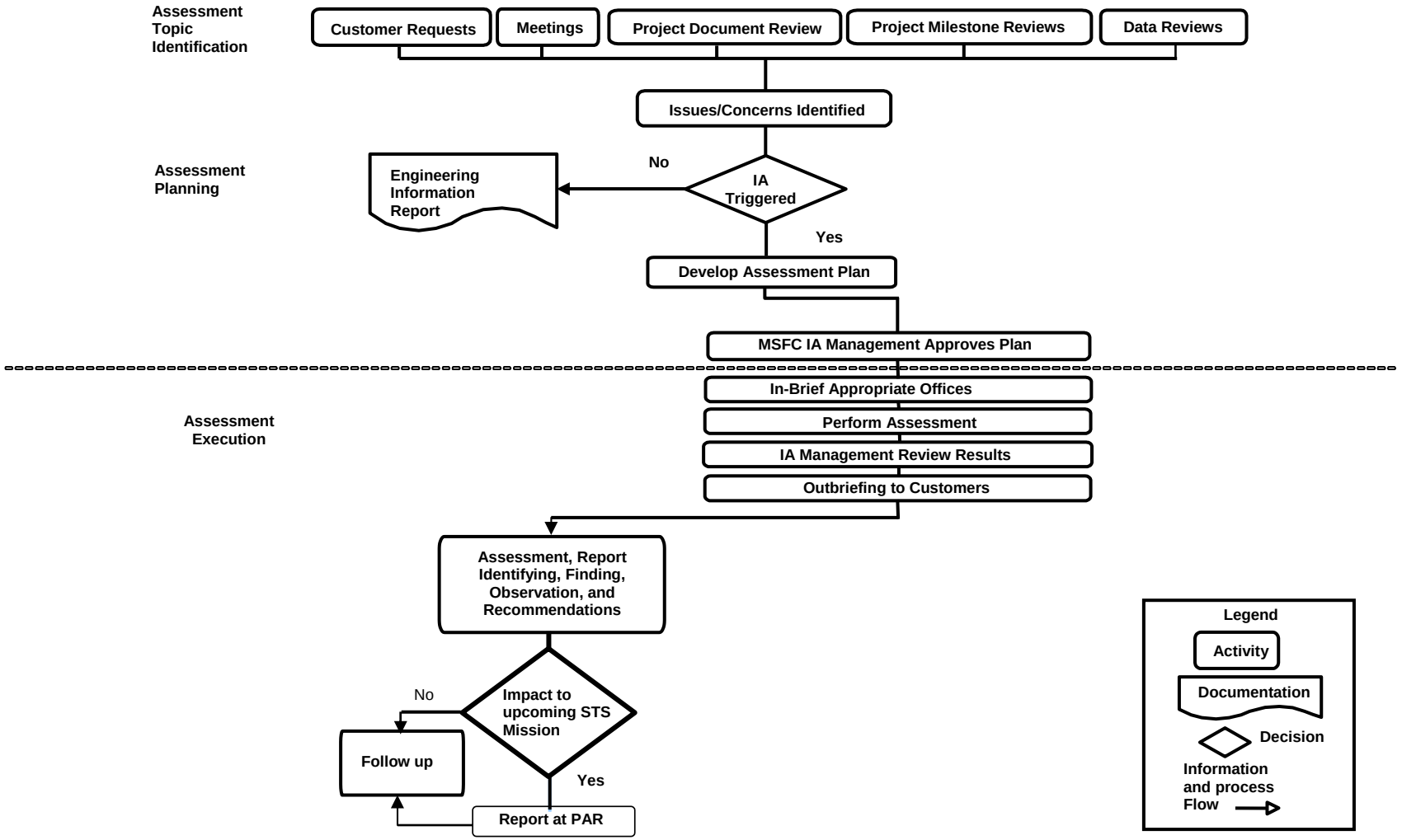
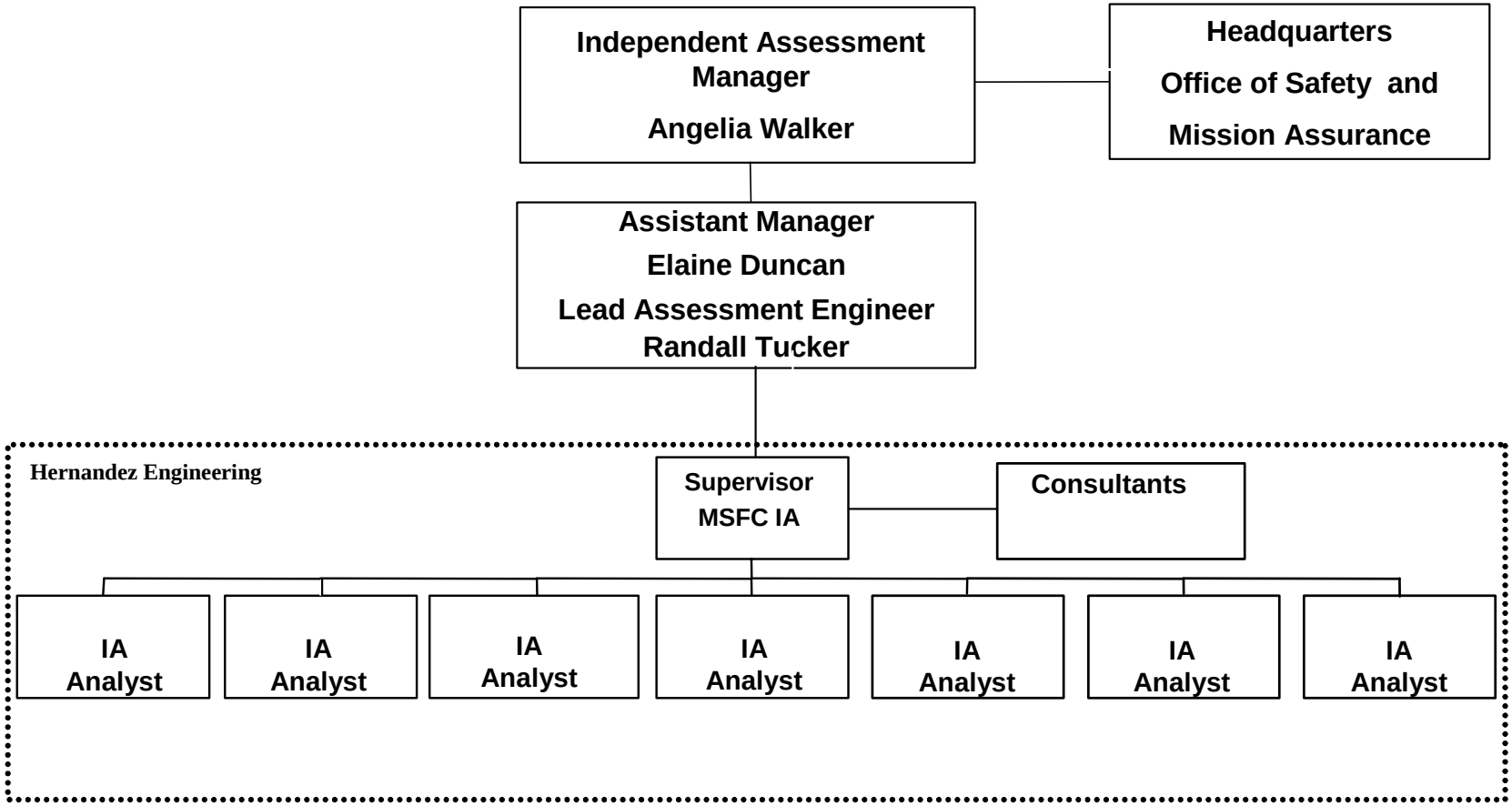
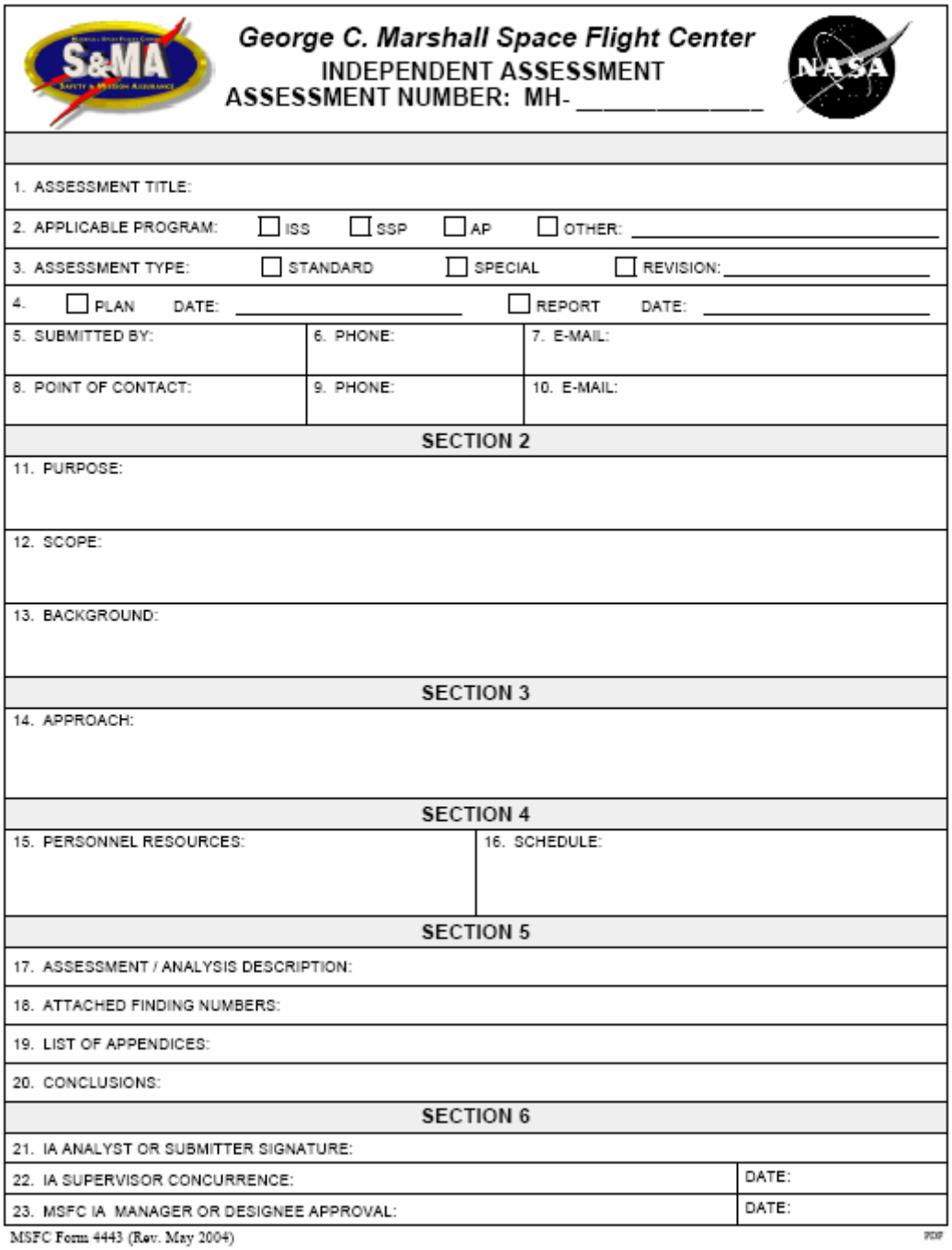


Figure 2
MSFC IA ORGANIZATION



APENDIX 1 INDEPENDENT ASSESSMENT PLAN/REPORT FORM



George C. Marshall Space Flight Center
INDEPENDENT ASSESSMENT
ASSESSMENT NUMBER: MH-_____

1. ASSESSMENT TITLE:

2. APPLICABLE PROGRAM: ☐ ISS ☐ SSP ☐ AP ☐ OTHER: _____

3. ASSESSMENT TYPE: ☐ STANDARD ☐ SPECIAL ☐ REVISION: _____

4. ☐ PLAN DATE: _____ ☐ REPORT DATE: _____

5. SUBMITTED BY:	6. PHONE:	7. E-MAIL:
8. POINT OF CONTACT:	9. PHONE:	10. E-MAIL:

SECTION 2

11. PURPOSE:

12. SCOPE:

13. BACKGROUND:

SECTION 3

14. APPROACH:

SECTION 4

15. PERSONNEL RESOURCES:	16. SCHEDULE:

SECTION 5

17. ASSESSMENT / ANALYSIS DESCRIPTION:

18. ATTACHED FINDING NUMBERS:

19. LIST OF APPENDICES:

20. CONCLUSIONS:

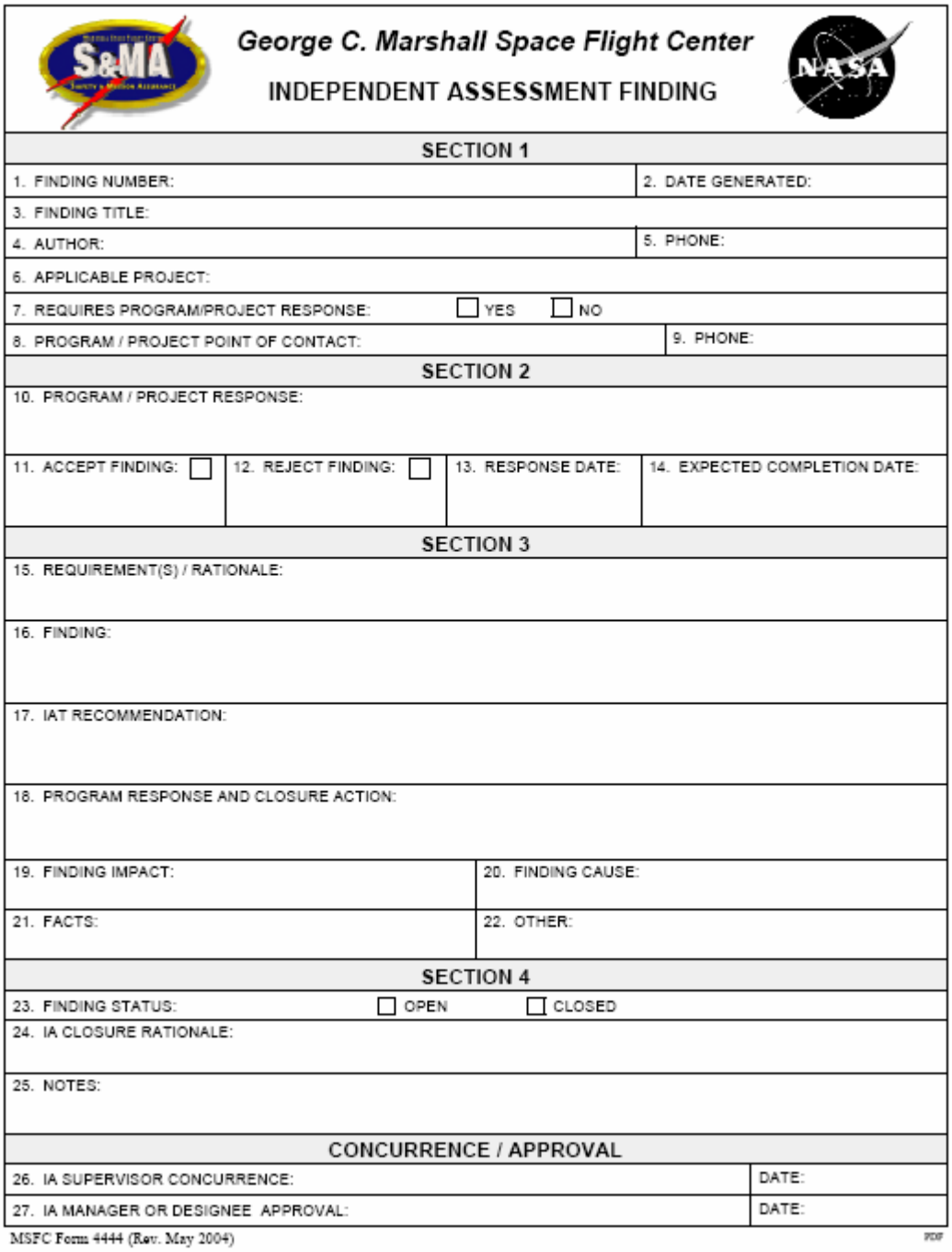
SECTION 6

21. IA ANALYST OR SUBMITTER SIGNATURE:

22. IA SUPERVISOR CONCURRENCE:	DATE:
23. MSFC IA MANAGER OR DESIGNEE APPROVAL:	DATE:

MSFC Form 4443 (Rev. May 2004)

APPENDIX 2 INDEPENDENT ASSESSMENT FINDING FORM



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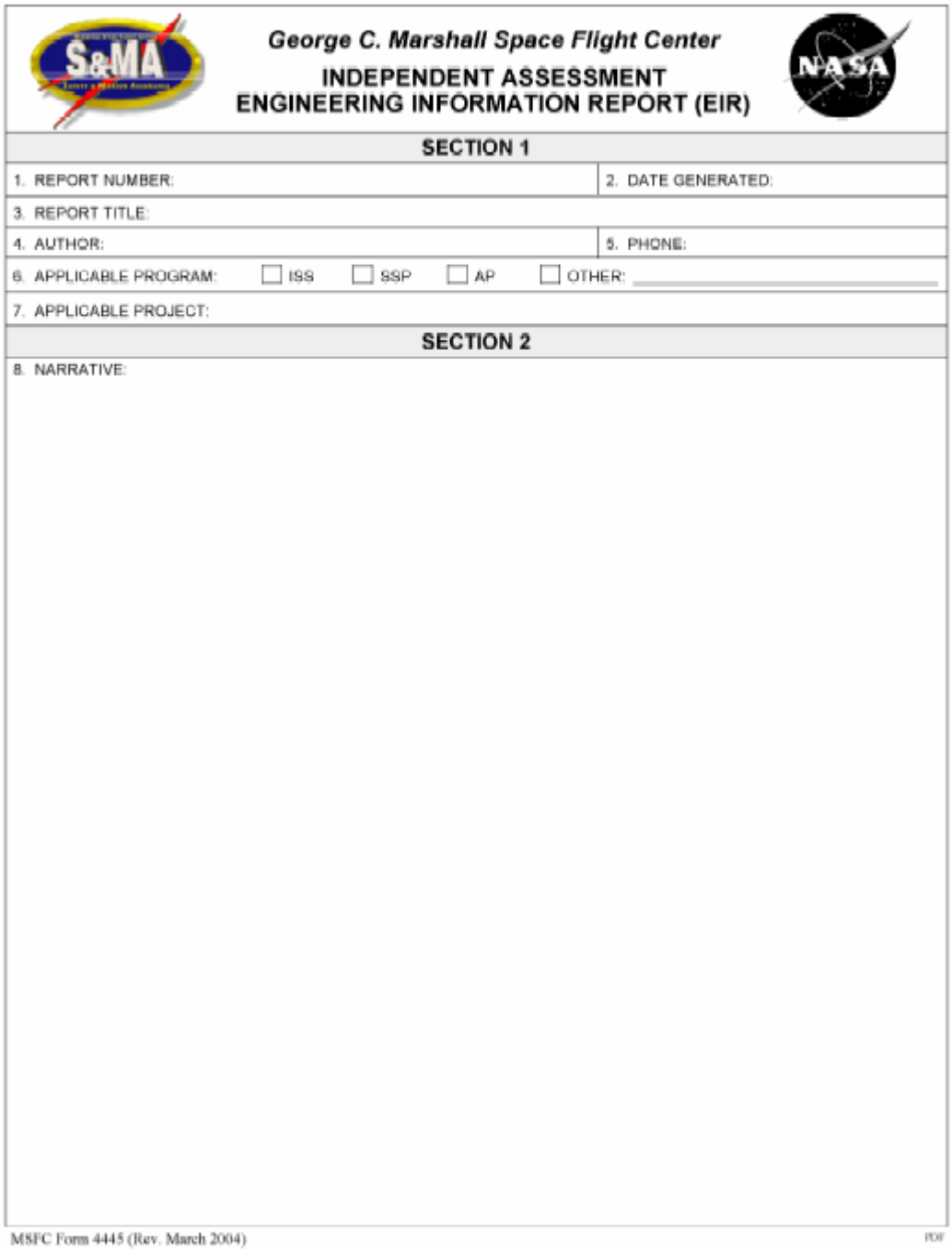
INDEPENDENT ASSESSMENT FINDING

SECTION 1			
1. FINDING NUMBER:			2. DATE GENERATED:
3. FINDING TITLE:			
4. AUTHOR:			5. PHONE:
6. APPLICABLE PROJECT:			
7. REQUIRES PROGRAM/PROJECT RESPONSE: ☐ YES ☐ NO			
8. PROGRAM / PROJECT POINT OF CONTACT:			9. PHONE:
SECTION 2			
10. PROGRAM / PROJECT RESPONSE:			
11. ACCEPT FINDING: ☐	12. REJECT FINDING: ☐	13. RESPONSE DATE:	14. EXPECTED COMPLETION DATE:
SECTION 3			
15. REQUIREMENT(S) / RATIONALE:			
16. FINDING:			
17. IAT RECOMMENDATION:			
18. PROGRAM RESPONSE AND CLOSURE ACTION:			
19. FINDING IMPACT:		20. FINDING CAUSE:	
21. FACTS:		22. OTHER:	
SECTION 4			
23. FINDING STATUS: ☐ OPEN ☐ CLOSED			
24. IA CLOSURE RATIONALE:			
25. NOTES:			
CONCURRENCE / APPROVAL			
26. IA SUPERVISOR CONCURRENCE:			DATE:
27. IA MANAGER OR DESIGNEE APPROVAL:			DATE:

MSFC Form 4444 (Rev. May 2004)

APPENDIX 3 ENGINEERING INFORMATION REPORT (EIR) FORM



George C. Marshall Space Flight Center

INDEPENDENT ASSESSMENT
ENGINEERING INFORMATION REPORT (EIR)

SECTION 1

1. REPORT NUMBER:	2. DATE GENERATED:
3. REPORT TITLE:	
4. AUTHOR:	5. PHONE:
6. APPLICABLE PROGRAM: ☐ ISS ☐ SSP ☐ AP ☐ OTHER:	
7. APPLICABLE PROJECT:	

SECTION 2

8. NARRATIVE:

MSFC Form 4445 (Rev. March 2004) PDF

APPENDIX 4 INDEPENDENT ASSESSMENT REVIEW RESPONSIBILITIES

Review Project Documentation

1. Project Plans, including Work Breakdown Structures
2. Contractor Reports and Presentations
3. Systems Engineering Management Plan
4. System Requirements Definition
5. Risk Management Plan
6. Configuration/Data Management Plan, including Data Requirements Definition
7. Project Review Plans
8. Quality Management Plan
9. Technical Convergence Plan
10. Verification and Validation Plan (software and hardware)
11. Reliability and Maintainability Plan
12. System Integration Plan
13. All Design Review Packages (i.e., Preliminary Design Review (PDR) and Critical Design Review (CDR) Package)
14. Interface Control Documents
15. Manufacturing Plans
16. Test Plans & Reports
17. Acceptance & Delivery Plans
18. Trends and Metrics
19. System Safety Plan

Attend Milestone Reviews and Standing Meetings

1. Major Milestone Review Meetings (e.g., Systems Requirements Review, PDR and CDR)
2. Regular Weekly and Monthly Project Meetings
3. Functional Working Group Meetings
4. Contractor Telecons
5. Problem Resolution Meetings
6. Manufacturing Reviews
7. Test Reviews
8. Acceptance and Delivery Reviews
9. Preflight Reviews (Stage Operational Readiness Review, PAR, Flight Readiness Review, etc)
10. Postflight and Mission Operation Reviews